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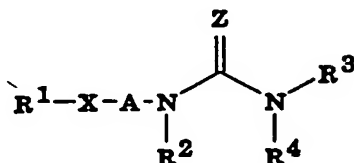
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : A01N 35/08, 43/50, 43/54 A01N 51/00	A1	(11) International Publication Number: WO 91/17659 (43) International Publication Date: 28 November 1991 (28.11.91)
(21) International Application Number: PCT/US91/03118 (22) International Filing Date: 10 May 1991 (10.05.91) (30) Priority data: 524,738 17 May 1990 (17.05.90) US (60) Parent Application or Grant (63) Related by Continuation US 524,738 (CIP) Filed on 17 May 1990 (17.05.90) (71) Applicants (for all designated States except US): E.I. DU PONT DE NEMOURS AND COMPANY [US/US]; 1007 Market Street, Wilmington, DE 19898 (US). UNIVERSITY OF SOUTH CAROLINA [US/US]; Osborne Administration Building, Columbia, SC 29208 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): CHAPMAN, James, Mood [US/US]; 1111 Watermark Place, Columbia, SC 29210 (US). KOLLMAYER, Willy, Dietrich [US/US]; 28 Raphael Road, Hockessin, DE 19707 (US). KOSH, Joseph, William [US/US]; 105 Nut Tree Court, Lexington, SC 29072 (US). McCANN, Stephen Frederick [US/US]; 2012 Christiana Meadows, Bear, DE 19702 (US). SO-WELL, Joseph, Walter [US/US]; 1704 Blackbird Drive, West Columbia, SC 29169 (US). ZWICK, Faith, Biersch [US/US]; 1228 Paper Mill Road, Newark, DE 19711 (US).	(74) Agents: COSTELLO, James, A. et al.; E.I. du Pont de Nemours and Company, Legal/Patent Records Center, 1007 Market Street, Wilmington, DE 19898 (US). (81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), US. Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	
(54) Title: ARTHROPODICIDAL NITROETHYLENES AND NITROGUANIDINES		
<div style="text-align: center;"> $\begin{array}{c} \text{Z} \\ \parallel \\ \text{R}^1\text{-X-A-N} \begin{array}{c} \\ \text{R}^2 \end{array} \text{C} \begin{array}{c} \text{N-R}^3 \\ \\ \text{R}^4 \end{array} \end{array}$ </div> <div style="text-align: right; margin-top: 10px;">(I)</div>		
(57) Abstract Arthropods are controlled in agronomic and nonagronomic environments by contacting them or their environment with an effective amount of a compound of formula (I), wherein R ¹ to R ⁴ , X, A, and Z are as defined in the text, including arthropodicidal compositions containing said compound(s).		

CLAIMS

What is claimed is:

1. An arthropodicidal composition comprising, as active ingredient, a compound of the formula:



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in an amount effective to control planthoppers and leafhoppers, and a carrier therefor, wherein:

Z is selected from the group CHNO_2 and NNO_2 ;

X is selected from S(O)_n ;

A is selected from the group $\text{C}_1\text{-C}_4$ alkylene optionally substituted with $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_2\text{-C}_3$ alkoxy carbonyl, halogen and CN;

R^1 is selected from the group $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl and $\text{C}_4\text{-C}_6$ cycloalkylalkyl;

n is 0, 1 or 2;

R^2 and R^3 are independently selected from the group H, CH_2CN , $\text{C}_1\text{-C}_4$ alkyl, CHO, $\text{C}_2\text{-C}_4$ alkyl carbonyl, $\text{C}_2\text{-C}_3$ alkoxy carbonyl, $\text{C}_2\text{-C}_4$ alkoxy alkyl, $\text{C}_3\text{-C}_6$ dialkoxy alkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ alkyl sulfonyl, $\text{C}_3\text{-C}_4$ alkenyl, $\text{C}_3\text{-C}_4$ alkynyl, $\text{C}_1\text{-C}_4$ alkyl amino, $\text{C}_2\text{-C}_4$ dialkyl amino and benzyl substituted with R^5 ;

R^4 is selected from the group $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl and $\text{C}_4\text{-C}_6$ cycloalkylalkyl; or

R^2 and R^4 can be taken together as C_2-C_3 alkylene or C_2-C_3 alkenylene each optionally substituted with 1-4 C_1-C_2 alkyl; and

5 R^5 is selected from the group halogen, C_1-C_2 alkyl, C_1-C_2 haloalkyl, C_1-C_2 alkoxy, C_1-C_2 thioalkyl, C_1-C_2 halothioalkyl, C_1-C_2 haloalkoxy, NO_2 and CN .

10 2. A composition according to Claim 1 wherein Z is $CHNO_2$.

3. A composition according to Claim 1 wherein Z is NNO_2 .

15 4. A composition according to Claim 2 wherein:
A is CH_2CH_2 ;

R^1 is selected from the group C_1-C_4 alkyl;

R^2 and R^3 are independently selected from the group H, C_1-C_4 alkyl, C_2-C_3 alkoxycarbonyl and C_2-C_4 alkylcarbonyl; and

20 R^4 is selected from the group C_1-C_4 alkyl.

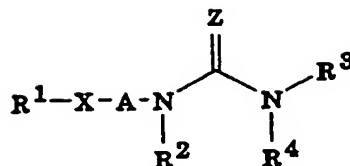
25 5. A composition according to Claim 2 wherein R^2 and R^4 are taken together and independently selected from the group C_2-C_3 alkylene and C_2-C_3 alkenylene, each optionally substituted by 1-4 C_1-C_4 alkyl.

6. A composition according to Claim 4 wherein X is S.

30 7. A composition according to Claim 5 wherein X is S.

8. A method for controlling planthoppers and leafhoppers which comprises applying to them or to their environment an effective amount of a compound of the formula:

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wherein:

- 10 Z is selected from the group CHNO_2 and NNO_2 ;
 X is selected from S(O)_n ;
 A is selected from the group $\text{C}_1\text{-C}_4$ alkylene optionally substituted with $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_2\text{-C}_3$ alkoxy carbonyl, halogen and CN;
 15 R^1 is selected from the group $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl and $\text{C}_4\text{-C}_6$ cycloalkylalkyl;
 n is 0, 1 or 2;
 R^2 and R^3 are independently selected from the group H, CH_2CN ,
 20 $\text{C}_1\text{-C}_4$ alkyl, CHO, $\text{C}_2\text{-C}_4$ alkyl carbonyl, $\text{C}_2\text{-C}_3$ alkoxy carbonyl, $\text{C}_2\text{-C}_4$ alkoxy alkyl, $\text{C}_3\text{-C}_6$ dialkoxy alkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ alkyl sulfonyl, $\text{C}_3\text{-C}_4$ alkenyl, $\text{C}_3\text{-C}_4$ alkynyl, $\text{C}_1\text{-C}_4$ alkyl amino, $\text{C}_2\text{-C}_4$ dialkyl amino and benzyl substituted with R^5 ;
 R^4 is selected from the group $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ haloalkyl,
 25 $\text{C}_3\text{-C}_6$ cycloalkyl and $\text{C}_4\text{-C}_6$ cycloalkylalkyl; or
 R^2 and R^4 can be taken together as $\text{C}_2\text{-C}_3$ alkylene or $\text{C}_2\text{-C}_3$ alkenylene each optionally substituted with 1-4 $\text{C}_1\text{-C}_2$ alkyl;
 and
 30 R^5 is selected from the group halogen, $\text{C}_1\text{-C}_2$ alkyl, $\text{C}_1\text{-C}_2$ haloalkyl, $\text{C}_1\text{-C}_2$ alkoxy, $\text{C}_1\text{-C}_2$ thioalkyl, $\text{C}_1\text{-C}_2$ halothioalkyl, $\text{C}_1\text{-C}_2$ haloalkoxy, NO_2 and CN.

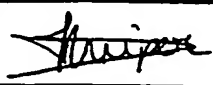
9. A method according to Claim 8 wherein Z is CHNO_2 .

10. A method according to Claim 8 wherein Z is NNO_2 .
11. A method according to Claim 9 wherein:
5 A is CH_2CH_2 ;
R¹ is selected from the group C₁-C₄ alkyl;
R² and R³ are independently selected from the group H,
C₁-C₄ alkyl, C₂-C₃ alkoxy carbonyl and C₂-C₄
alkyl carbonyl; and
10 R⁴ is selected from the group C₁-C₄ alkyl.
12. A method according to Claim 9 wherein R² and R⁴ are taken
together and independently selected from the group C₂-C₃ alkylene and
C₂-C₃ alkenylene, each optionally substituted by 1-4 C₁-C₄ alkyl.
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13. A method according to Claim 11 wherein X is S.
14. A method according to Claim 12 wherein X is S.
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 91/03118

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.C1.5 A 01 N 51/00	A 01 N 35/08 A 01 N 43/50	A 01 N 43/54
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.C1.5	A 01 N	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	GB,A,1483633 (SHELL) 24 August 1977, see claims 1,15-18; page 4, lines 113-118 (cited in the application) ---	1,2,5,7 ,8,9,12 ,14
X	FR,A,2322849 (SHELL) 1 April 1977, see claims 2,5 & US-A-4 025 529 (cited in the application) ---	1,2,4-9 ,11-14
X	EP,A,0302389 (TAKEDA CHEMICAL INDUSTRIES) 8 February 1989, see claim 12, page 3, line 5 - page 5, line 39; page 42, line 31 (cited in the application) ---	1,2,8,9
X,P	EP,A,0381130 (TAKEDA CHEMICAL INDUSTRIES) 8 August 1990, see page 5, formula V; page 6, lines 13-18; page 20, lines 1-3 --- -/-	1,2,8,9
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
27-08-1991	04 OCT 1991	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	Mme N. KUIPER 	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	EP, A, 0254859 (NIHON TOKUSHU NOYAKU SEIZO) 3 February 1988, & US-A-4 806 553 (cited in the application) -----	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

US 9103118
SA 47604

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